

CLAIMS

What is claimed is:

- 1 1. A method comprising:
 - 2 invoking a system management interrupt (SMI) handler in response to an SMI;
 - 3 determining a thermal state of a processor by the SMI handler; and
 - 4 interacting between the SMI handler and one of a speed step technology (SST)
 - 5 applet and a thermal driver in a thermal management operating system (OS) to
 - 6 transition the processor to one of a low power state and a high power state based on the
 - 7 thermal state according to a native performance control status.
- 1 2. The method of claim 1 wherein invoking the SMI comprises:
 - 2 invoking the SMI at predetermined time intervals.
- 1 3. The method of claim 1 wherein determining the thermal state comprises:
 - 2 reading a sensor indicating temperature of the processor.
- 1 4. The method of claim 1 wherein interacting comprises:
 - 2 if the native performance control is enabled, interacting with the thermal
 - 3 management OS; and
 - 4 if the native performance control is not enabled, interacting with the SST applet.
- 1 5. The method of claim 4 wherein interacting with the thermal
 - 2 management OS comprises:
 - 3 invoking a source language code compatible with the thermal OS by the SMI
 - 4 handler, the source language code indicating availability status of the high power state
 - 5 based on the thermal state, the availability status being available if the thermal state
 - 6 corresponding to a low temperature and being unavailable if the thermal state
 - 7 corresponds to a high temperature;
 - 8 exiting the SMI handler;
 - 9 invoking the source language code by the thermal driver;
 - 10 executing the source language code, the executed source language code
 - 11 notifying a processor object of the availability status of the high power state via a
 - 12 present performance capability structure; and

13 transitioning the processor to the low power state if the availability status is
14 unavailable and to one of a current state and the high power state if the availability
15 status is available.

1 6. The method of claim 5 wherein interacting comprises:
2 interacting between the SMI handler and the thermal driver in an advanced
3 configuration and power management (ACPI) operating system (OS).

1 7. The method of claim 6 wherein invoking the source language code
2 comprises:
3 invoking an ACPI source language code (ASL).

1 8. The method of claim 4 wherein interacting with the SST applet
2 comprises:
3 transitioning the processor to a last requested performance state in the SST
4 applet if the thermal state corresponds to a low temperature;
5 saving current processor performance state in the SST applet if the thermal state
6 corresponds to a high temperature;
7 transitioning the processor to the low power state if the thermal state
8 corresponds to a high temperature; and
9 exiting the SMI handler.

1 9. The method of claim 1 further comprising:
2 processing an SST command using the SST applet.

1 10. The method of claim 1 wherein processing the SST command
2 comprises:
3 returning a current processor state if the SST command is a get status command;
4 recording a requested state if the SST command is a set state command and the
5 thermal state corresponds to a high temperature; and
6 transitioning the processor to a last requested state and recording the current
7 processor state if the SST command is a set state command and the thermal state
8 corresponds to a low temperature.

1 11. A computer program product comprises:

2 a machine useable medium having computer program code embedded therein,
3 the computer program product having:
4 computer readable program code to invoke a system management
5 interrupt (SMI) handler in response to an SMI;
6 computer readable program code to determine a thermal state of a
7 processor by the SMI handler; and
8 computer readable program code to interact between the SMI handler
9 and one of a speed step technology (SST) applet and a thermal driver in a
10 thermal management operating system (OS) to transition the processor to one of
11 a low power state and a high power state based on the thermal state according to
12 a native performance control status.

1 12. The computer program product of claim 11 wherein the computer
2 readable program code to invoke the SMI comprises:
3 computer readable program code to invoke the SMI at predetermined time
4 intervals.

1 13. The computer program product of claim 11 wherein the computer
2 readable program code to determine the thermal state comprises:
3 computer readable program code to read a sensor indicating temperature of the
4 processor.

1 14. The computer program product of claim 11 wherein the computer
2 readable program code to interact comprises:
3 computer readable program code to interact with the thermal management OS if
4 the native performance control is enabled; and
5 computer readable program code to interact with the SST applet if the native
6 performance control is not enabled.

1 15. The computer program product of claim 14 wherein the computer
2 readable program code to interact with the thermal management OS comprises:
3 computer readable program code to invoke a source language code compatible
4 with the thermal OS by the SMI handler, the source language code indicating
5 availability status of the high power state based on the thermal state, the availability

6 status being available if the thermal state corresponding to a low temperature and being
7 unavailable if the thermal state corresponds to a high temperature;
8 computer readable program code to exit the SMI handler;
9 computer readable program code to invoke the source language code by the
10 thermal driver;
11 computer readable program code to execute the source language code, the
12 executed source language code notifying a processor object of the availability status of
13 the high power state via a present performance capability structure; and
14 computer readable program code to transition the processor to the low power
15 state if the availability status is unavailable and to one of a current state and the high
16 power state if the availability status is available.

1 16. The computer program product of claim 15 wherein the computer
2 readable program code to interact comprises:
3 computer readable program code to interact between the SMI handler and the
4 thermal driver in an advanced configuration and power management (ACPI) operating
5 system (OS).

1 17. The computer program product of claim 16 wherein the computer
2 readable program code to invoke the source language code comprises:
3 computer readable program code to invoke an ACPI source language code
4 (ASL).

1 18. The computer program product of claim 14 wherein the computer
2 readable program code to interact with the SST applet comprises:
3 computer readable program code to transition the processor to a last requested
4 performance state in the SST applet if the thermal state corresponds to a low
5 temperature;
6 computer readable program code to save current processor performance state in
7 the SST applet if the thermal state corresponds to a high temperature;
8 computer readable program code to transition the processor to the low power
9 state if the thermal state corresponds to a high temperature; and
10 computer readable program code to exit the SMI handler.

1 19. The computer program product of claim 11 further comprising:

2 computer readable program code to process an SST command using the SST
3 applet.

1 20. The computer program product of claim 11 wherein the computer
2 readable program code to process the SST command comprises:

3 computer readable program code to return a current processor state if the SST
4 command is a get status command;

5 computer readable program code to record a requested state if the SST
6 command is a set state command and the thermal state corresponds to a high
7 temperature; and

8 computer readable program code to transition the processor to a last requested
9 state and recording the current processor state if the SST command is a set state
10 command and the thermal state corresponds to a low temperature.

1 21. A system comprising:

2 a processor;

3 a memory coupled to the processor to store a thermal management module, the
4 thermal management module including a system management interrupt (SMI) handler
5 and a thermal management operating system (OS), the thermal management module,
6 when executed, causing the processor to:

7 invoke a system management interrupt (SMI) handler in response to an
8 SMI,

9 determine a thermal state of a processor by the SMI handler, and

10 interact between the SMI handler and one of a speed step technology
11 (SST) applet and a thermal driver in a thermal management operating system
12 (OS) to transition the processor to one of a low power state and a high power
13 state based on the thermal state according to a native performance control
14 status.

1 22. The system of claim 21 wherein the thermal management module
2 causing the processor to invoke the SMI causes the processor to:

3 invoke the SMI at predetermined time intervals.

1 23. The system of claim 21 wherein the thermal management module
2 causing the processor to determine the thermal state causes the processor to:

3 read a sensor indicating temperature of the processor.

1 24. The system of claim 21 wherein the thermal management module
2 causing the processor to interact causes the processor to:
3 interact with the thermal management OS if the native performance control is
4 enabled; and
5 interact with the SST applet if the native performance control is not enabled.

1 25. The system of claim 24 wherein the thermal management module
2 causing the processor to interact with the thermal management OS causes the processor
3 to:
4 invoke a source language code compatible with the thermal OS by the SMI
5 handler, the source language code indicating availability status of the high power state
6 based on the thermal state, the availability status being available if the thermal state
7 corresponding to a low temperature and being unavailable if the thermal state
8 corresponds to a high temperature;
9 exit the SMI handler;
10 invoke the source language code by the thermal driver;
11 execute the source language code, the executed source language code notifying
12 a processor object of the availability status of the high power state via a present
13 performance capability structure; and
14 transition the processor to the low power state if the availability status is
15 unavailable and to one of a current state and the high power state if the availability
16 status is available.

1 26. The system of claim 25 wherein the thermal management module
2 causing the processor to interact causes the processor to:
3 interact between the SMI handler and the thermal driver in an advanced
4 configuration and power management (ACPI) operating system (OS).

1 27. The system of claim 26 wherein the thermal management module
2 causing the processor to invoke the source language code causes the processor to:
3 invoke an ACPI source language code (ASL).

1 28. The system of claim 24 wherein the thermal management module
2 causing the processor to interact with the SST applet causes the processor to:
3 transition the processor to a last requested performance state in the SST applet if
4 the thermal state corresponds to a low temperature;
5 save current processor performance state in the SST applet if the thermal state
6 corresponds to a high temperature;
7 transition the processor to the low power state if the thermal state corresponds
8 to a high temperature; and
9 exit the SMI handler.

1 29. The system of claim 21 the thermal management module, when
2 executed, further causes the processor to:
3 process an SST command using the SST applet.

1 30. The system of claim 21 wherein the thermal management module
2 causing the processor to process the SST command causes the processor to:
3 return a current processor state if the SST command is a get status command;
4 record a requested state if the SST command is a set state command and the
5 thermal state corresponds to a high temperature; and
6 transition the processor to a last requested state and recording the current
7 processor state if the SST command is a set state command and the thermal state
8 corresponds to a low temperature.